REMARKS

Re-examination and allowance of the present application is respectfully requested.

1. Applicant reviewed the drawings and found no errors that need correction.

2. Applicant reviewed the specification and placed the abstract on a separate sheet which is enclosed.

3. Applicant amended the claims by adding "statically", "standard passive" and "without relative motion between them" to claims 1, 42, and 53 to provide an additional basic differentiator between prior art and current invention. Statically is used as an adjective to reflect the fact that the card is placed proximate the writing head (conductor array) and that the two do not move relative to each other as conventional writing heads do. The term standard is used to emphasize that the medium written onto is a magnetic stripe card and not a smart card. The term passive is used to emphasize that the card has no active built-in electronic devices or circuitry. The expression of "without relative motion between them" is further emphasis of the unique nature of statically writing onto the card. Reference specification paragraph 51 "There is thus provided in accordance with this aspect of the invention a method for writing data on a

magnetic stripe of a magnetic card, comprising:

(i) providing a conductor array proximate to the magnetic stripe;

(ii) providing current drivers for sending currents in controlled direction through the conductor array; and

(iii) sending currents, using said current drivers, through conductors of the array for generating magnetic field of sufficient magnitude so as to overcome the coersivity of the magnetic stripe."; Paragraph 52: "The invention further provides for a system for writing data on a magnetic stripe of a card, comprising a writing device capable of writing data onto the magnetic stripe being placed in proximity thereto, such that the writing device is characterized as having no moving parts.". and paragraph 71 "The matrix form can be effectively used as a standard magnetic stripe card writer, as will be shown later. These magnetic stripe card writers are static in the sense that there are no moving parts."

Additional claim amendments are primarily syntactical and grammatical corrections

4. Applicant submits that Gutman et al (US Patent No. 6,206,293) (hereinafter referred to as 'Gutman') teaches a method of writing and reading data to a magnetic smart card that contains electronic circuitry

such as a controller 208 and drivers for conductor 204. "The electrically driven conductor 204 emits an alternating polarity magnetic field about the conductor 204 in accordance with the data signal. The alternating polarity of the magnetic field about the conductor 204 comprises magnetic flux transitions. These magnetic flux transitions can be picked up by the magnetic reading head 103 and detected by the magnetic card reader 100 to indicate bits of information corresponding to the data signal provided by the controller 208.

In a preferred embodiment, the controller 208 provides the data signal to operate the driver circuit 206 to selectively drive each of the at least one conductor 204 in any one of three states. First, the driver circuit 206 can forward drive a current through the conductor 204 to emit a magnetic field with a first polarity. Second, the driver circuit 206 can drive the conductor 204 with a reverse current to emit a magnetic field of a second polarity. Third, the driver circuit 206 can remain in an idle state, neither forward driving nor reverse driving the conductor 204.

For example, in a second alternative embodiment, the card 200 could include only the driver circuit 304 coupled to the conductor 204 for writing information from the card 200 to the magnetic card reader 100. In a third alternative embodiment, the card 200 includes only the detector circuit 318

coupled to the conductor 204 for reading information from the magnetic card reader 100 into the card 200.

The controller 208, in a write mode operation, activates switch circuit 316 to selectively couple the driver circuit 304 to the conductor 204. The controller 208 then couples a data signal to the driver circuit 304 to electrically drive the conductor 204 in accordance with the data signal. The driven conductor 204 emits, for example, an alternating polarity magnetic field (see FIGS. 11 and 12) to write information, preferably encoded in magnetic flux transitions that can be detected by the magnetic card reader 100.

This read mode operation, in one embodiment, would be an analogous operation to a magnetic card reader 100 writing information to a third track of a magnetic stripe 110 of a card 106 (see FIG. 1)."

Applicant included in the original application two additional embodiments, one of which was similar to Gutman but it is not claimed after discovery of Gutman and other prior art. While Gutman teaches reading from and writing to an active card comprising of active electronic elements that are "analogous" to and is thus emulating a magnetic stripe card, the applicant claims a method of writing to a standard passive magnetic stripe which is read from by swiping, just as any conventional card.

5. Gutman does not teach using a <u>multi-dimensional conductor array</u> for writing onto a magnetic stripe card placed proximate the array. However, the present invention teaches a method of <u>statically</u> writing onto a standard magnetic stripe card placed proximate the array <u>without motion of the card relative the writing and reading mechanism. The said conductor array as shown, for example, in Fig. 4c, is two-dimensional and therefore this write head requires four drivers for driving 16 conductors. The efficiency attained by higher ratios of the number of conductors to the number of drivers is archived with a larger conductor array and by adding dimensions to the array.</u>

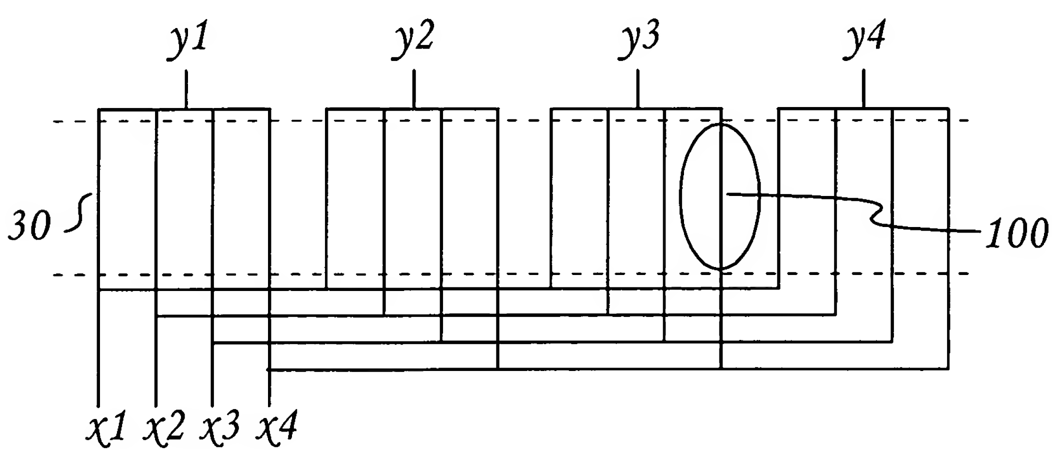

Fig. 4C

Applicant submits further clarifications regarding the novel aspect of the present invention with specific references from the specification.

Paragraph 50 and 51 of the specification: "Still further, there is provided in accordance with another aspect of the invention a new type of magnetic writer, with no moving parts. The magnetic writer includes a conductor array that is external to the card and is used as a magnetic stripe writer for writing onto standard magnetic stripe cards.

There is thus provided in accordance with this aspect of the invention a method for writing data on a magnetic stripe of a magnetic card, comprising:

(i) providing a conductor array proximate to the magnetic stripe;

(ii) providing current drivers for sending currents in controlled direction through the conductor array; and

(iii) sending currents, using said current drivers, through conductors of the array, for generating magnetic field of sufficient magnitude so as to overcome the coersivity of the magnetic stripe."

Paragraphs 61 through 70 of the specification: "Fig. 4B illustrates a matrix conductor array example of a single track layout in accordance with an embodiment of an aspect of the invention. Fig. 4B further clarifies how the matrix approach can be laid out in a single track. Note that the specific single track layout of Fig. 4B (of x1-x8 over y1-y4 matrix) corresponds to

the schematic matrix representation of the same x1-x8 over y1-y4 depicted in 4A.

The example illustrates the connecting links 101 between successive sets of domain conductors corresponding to x1 – x8 and y1 –y4, respectively. Note that these links 101 are perpendicular to the domain active conductors, and therefore have no impact on the data content. For example, the domain active conductors Y2 and X6 that control domain 100 are normal to links 101, and therefore currents flowing through links 101 have substantially no impact on the magnitudes of the currents flowing through X6 and Y2 conductors at location 100. Note that in the layout of Fig. 4B, each of the X and Y conductors (by this particular example, 4 and 8, altogether 12) have a square waveform-like shape, and that active conductor segments of each *i,j,* conductors (e.g. the conductors segments 100 that are associated with their domain) are placed proximate and substantially parallel to the domain (the domain is not depicted in Fig. 4B).

Note that in order to further reduce any registration of the links on the magnetic stripe material, these links can be placed on the back layer of the matrix substrate.

Those versed in the art will readily appreciate that the invention is not bound by the specific layout depicted in Fig. 4B.

Utilizing a conductor array in accordance with the embodiment of Fig 4 constitutes a significant advantage over the conductor arrangement offered in the '659 PCT publication, in that it requires considerably lesser number of conductors and simpler associated electronics. Thus, a matrix having A rows and B columns can support up to A * B entries, i.e. bits. For instance, in the case of 500 bits, 1000 domains are required and, thus, a 32 over 32 matrix can be employed such that any one of the 1000 domains (or up to 1024 domains) is controlled by a unique (i,j) entry. Accordingly, 64 lines are required to write any desired bit in the series of 500 bits. Even if each entry is implemented by using 2 conductors (i.e. 2 conductors per domain, similar to the solution offered by the '659 PCT application) in order to facilitate inversion of current flow direction, still, a total of 64 * 2, i.e. 128 conductors are utilized compared to 2000 as was the case in the invention according to the '659 publication. Obviously, simpler associated electronics are required, e.g. fewer current drivers are required. Moreover, note that in order to write a bit value in location (i,j), the sum of the currents flowing through entry i and entry j should be high enough to overcome the coercivity of the magnetic domain that corresponds to the (i,j) bit. This necessarily entails that the current through each entry is of lesser intensity than the total current required overcoming the magnetic domain coercivity. Considering the lower current flow through each entry, this requires use of current drivers of lower power. Thus, this embodiment offers use of

considerably fewer conductors, with simpler associated electronics that includes considerably fewer transistors, each of which support lower current. This necessarily entails that the a chip that accommodates the conductors and the associated electronics in accordance with this embodiment has considerably lesser manufacturing costs and, due to the lesser number of conductors, current drivers and the lower current intensity, it lowers the cost and complexity of each driver compared to that provided in accordance with that of the 659 publication.

Note that the invention is not bound by the specified matrix realization. Thus, for example the matrix is not necessarily confined to identical number of rows and columns. The current flowing through each entry is likewise not necessarily identical. In other words, it is not necessarily required to push half current intensity through the line entry and another half current intensity through the columns entry in order to bring about a full current intensity required to overcome the coersivity of a magnetic domain. By way of example, 0.75 intensity may be driven through the row entry and 0.25 intensity through the column. Of course, other variants are applicable as required and appropriate. Note that, when using non-identical currents, a careful design should avoid undesired scenarios in which one of the currents is too close to be able to overcome the coersivity. For example, having one current with 0.98 intensity and the

other current with 0.02 appears to be risky, because in certain operational scenarios the 0.98 intensity current can overcome by itself the coersivity. The same consideration should apply to the utilization of non identical current in three-dimensional or greater matrix, as will be explained in greater detail below.

By way of another example, a three-dimensional matrix is employed, thus reducing even more the number of conductors that are used. For example, for 500 bits (or 1000 domains) a X * Y * Z matrix can be used with, 10 lines per dimension (supporting up to 1000 domains) giving rise to 30 (i.e. 10*3) lines. Even if using a bi-directional current switch on a single wire, such that two conductors are used (one for each current direction in accordance with the approach of the PCT publication), a total of 60 lines are required (i.e. 30*2), instead of 128 lines, as in the case of two-dimensional matrix exemplified above.

Another matrix example is illustrated in Fig. 4C. This matrix is two-dimensional and reduces the number of necessary drivers in the same manner as the matrix described in Figs 4A and 4B. However, the objective of this example is to emphasize a minimum number of conductors per bit. Consequently, a single conductor will be driven with enough current to overcome the coersivity of the magnetic stripe material, where the drivers

y3 and x4 selectively drive conductor element 100. All drivers in this example are bidirectional and drive current in the direction dictated by the data content. The importance of this matrix example is for cases where the technology reaches yield degradation at the range of high conductor densities (more than one conductor per 5 mils).

Other bi-dimensional or multi-dimensional conductor array arrangements that are not necessarily confined to matrix configuration are applicable, all as required and appropriate.

Note that the invention is not bound by the specific architecture illustrated in Fig. 4A through 4C, in which the conductor array (being in accordance with one embodiment of the invention in the form of a matrix of conductors) is located below the magnetic stripe layer."

6. Regarding other prior art that was considered pertinent to applicant's disclosure:

    a. Baus Jr. US Patent No. 5,650,606 teaches of writing onto and reading from a standard magnetic stripe card while the card is swiped i.e. card motion relative read/write head.

    b. Shinohara, et al. US Patent No. 4,634,848 teaches a method of information selecting of a multi channel magnetic stripe card in the

conventional sense of the card moving relative to the head.

Neither Baus Jr. nor Shinohara, et al. refers to a static writing capability i.e. without relative motion between the card and the head which is fundamental in the present application.

Applicant submits that the amended claims reflect that which is allowable within the previously submitted fees. Accordingly, entry of the present amendment is respectfully requested.

Respectfully submitted,

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